

GENERATOR CONTROL & PROTECTION (REF:OTSGCP001)

Course Objectives

At the end of this program the participants will be able to:

- Describe the construction and operation of the power generators
- Deal with the excitation system and control system
- Aware with the different operation modes of the generators
- Perform the operation and maintenance for the power generation units
- Perform the troubleshooting for the power generation unit and the associated systems

Course Outlines

Basic Generating Principles

- Generator General fundamentals
- Generator Construction and theory of operation
- Power Generation station type
- Generation of voltage and voltage regulation
- Voltage Control and AVR
- Frequency control And Governor
- Governor Control modes
- The Isochronous Mode of control
- Droop Mode of control

Three phase Generator and Excitation system

- The Generator rotor
- The Two Pole Rotor output Vs. The Four Pole Rotor output
- The Relationship between Frequency and RMP
- The Generator Stator & Three Stator Coils
- Multi - Voltage Output Connection
- Generator control devices
- The AVR or Automatic Voltage regulator
- Reactive power control(load sharing) and Excitation
- Active power control(load sharing) and rotation speed
- Generator capabilities curves

Generator Excitation system elements & different Types

- Functions and Performance Requirements
- Elements of an Excitation System
- DC excitation systems(conventional excitation)
- AC excitation systems
 - Stationary rectifier systems
 - Rotating rectifier systems
- Static excitation systems
- Brushless excitation
- Three phase brushless Exciting synchronouse generator
- LV Diesel generator common excitation system
 - Self-Excited (Shunt)
 - Excitation Boost System (EBS)



- Permanent Magnet Generator (PMG)
- Auxiliary Winding (AUX)

Generators Modes of operation and generator maintenance& troubleshooting

- Island operation mode
 - Load variation and generator performance
- Parallel Operation
 - Requirements & advantage
 - Example (equal capacities)
 - Example of (unequal capacities)
 - AVR and Governor control action
- Generator maintenance procedures
- Generator Troubleshooting & Problem Solving Case History Discussions
- The Most Common Generator Failures & How They Can Be Prevented

Generator Testing and protection

- Voltage restraint/dependent phase overcurrent
- Ground fault protection
- Differential protection
- Loss of Field protection
- Volts/Hertz protection
- Frequency protection
- Voltage protection
- Thermal protection

